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10/750,176	12/31/2003	Ruwan Jayanetti	022.0040 (A002)	5021

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EXAMINER	
SHERMAN, STEPHEN G	

ART UNIT	PAPER NUMBER
2629	

DATE MAILED: 12/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/750,176	JAYANETTI ET AL.	
	Examiner	Art Unit	
	Stephen G. Sherman	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 18-22* is/are rejected.

7)☒ Claim(s) *17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed the 5 October 2006. Claims 1-22 are pending.

Response to Arguments

2. Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abileah (US 2003/0222857) in view of Chang et al. (US 6,975,307).

Regarding claim 1, Abileah discloses an apparatus responsive to a resistive touch screen, of the type having a first conductive layer (Fig. 3, layer 78) and a second conductive layer (Fig. 3, layer 80) separated from one another under quiescent conditions and coupled with each other during a touch condition (Fig. 3, see para. 37, lines 17-20, where the layers do not make contact until the user presses on the top layer), said first and second conductive layers each having a first and second electrode (Fig. 3, bus bars 100, 102, 104, and 106), the apparatus comprising:

a detection circuit (Fig. 3, controller 108) coupled to said resistive touch screen, said detection circuit configured to provide a first reference voltage to the first and second electrodes of said first conductive layer and to provide a second reference voltage to the first and second electrodes of the second conductive layer (Fig. 3, see para. 38, where the controller must be the device that provides the reference voltages to the electrodes of each layer).

Abileah fails to teach of maintaining said first and second reference voltages substantially constant during said touch condition.

Chang et al. disclose of maintaining first and second reference voltages of a resistive touch screen device substantially constant during a touch operation (Figure 4 and column 3, lines 10-15 explain that the external powers V_{cx} and V_{cy} supply constant voltages to the x and y plates.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Chang et al. with the resistive touch screen

taught by Abileah in order to provide for improved touch detection of touches that are applied to the touch panel too lightly.

5. Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abileah (US 2003/0222857) in view of Chang et al. (US 6,975,307) and further in view of Colgan et al. (US 6,483,498).

Regarding claim 2, Abileah and Chang et al. disclose the apparatus as recited in claim 1.

Abileah and Chang et al. fail to teach wherein the resistive touch screen dissipates substantially zero power under quiescent conditions.

Colgan et al. disclose wherein the resistive touch screen dissipates substantially zero power under quiescent conditions (Fig. 7, see col. 7, lines 51-65, where if there is no current flowing prior to contact then there is substantially zero power dissipated).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Colgan et al. with the resistive touch screen taught by Abileah and Chang et al. in order to provide for lower power consumption in the touch panel device.

Regarding claim 3, Abileah and Chang et al. disclose the apparatus as recited in claim 1.

Abileah and Chang et al. fail to teach wherein approximately zero current is conducted by the first conductive layer and the second conductive layer under quiescent conditions.

Colgan et al. disclose wherein approximately zero current is conducted by the first conductive layer and the second conductive layer under said quiescent conditions (Fig. 7, see col. 7, lines 51-65, as discussed above).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Colgan et al. with the resistive touch screen taught by Abileah and Chang et al. in order to provide for lower power consumption in the touch panel device.

Regarding claim 4, Abileah, Chang et al. and Colgan et al. disclose the apparatus as recited in claim 3.

Colgan also discloses an apparatus wherein currents are conducted at the first and second electrodes of the first conductive layer when the first conductive layer couples to the second conductive layer and wherein currents are conducted at the first and second electrodes of the second conductive layer when the first conductive layer couples to the second conductive layer (Fig. 7, see col. 7, lines 51-65).

Regarding claim 5, Abileah, Chang et al. and Colgan et al. disclose the apparatus as recited in claim 4.

Abileah, Chang et al. and Colgan et al. further teach an apparatus wherein the first and second electrodes are coupled to opposing ends of the first conductive layer in a y-direction (Abileah, Fig. 3), wherein the first and second electrodes are coupled to opposing ends of the second conductive layer in a x-direction (Abileah, Fig. 3), and wherein a location where the first and second conductive layers couple together is determined from said currents conducted at the first and second electrodes of the first and second conductive layers (Colgan, Fig. 7, see col. 7, lines 51-65 as was discussed above).

Regarding claim 6, Abileah, Chang et al. and Colgan et al. disclose the apparatus as recited in claim 5.

Colgan further teaches an apparatus wherein a pressure applied to the resistive touch screen is calculated from said currents conducted at the first and second electrodes of the first and second conductive layers (Fig. 7, see col. 7, lines 51-65, where calculating a "contact" based on the currents as shown in the formulas is the same as calculating a "pressure").

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abileah (US 2003/0222857) in view of Wolfe ("A Case Study in Low-Power System-Level Design", October 2, 1995. Computer Design: VLSI in computers and processors 1995. ICCD 95. Proceedings, 1995 IEEE International Conference on Austin, TX, USA, XP010197333`1, pg. 332-338.).

Regarding claim 14, Abileah discloses a method of operating a resistive touch sensitive screen for increased security and lower power consumption, the resistive touch screen comprising

a first conductive layer and a second conductive layer (Fig. 3, layers 78 and 80),

the first conductive layer having a first electrode and a second electrode (Fig. 3, bus bars 100 and 102),

the second conductive layer having a first electrode and a second electrode (Fig. 3, bus bars 104 and 106).

Abileah fails to teach a method comprising the steps of: applying substantially equal voltages to the first and second electrodes of the first conductive layer and applying substantially equal voltages to the first and second electrodes of the second conductive layer such that approximately zero current is conducted in the first and second conductive layers under quiescent conditions.

Wolfe discloses a method comprising the steps of applying substantially equal voltages to the first and second electrodes of the first conductive layer and applying substantially equal voltages to the first and second electrodes of the second conductive layer such that approximately zero current is conducted in the first and second conductive layers under quiescent conditions (Figure 1 and page 333, 1 column lines 1-20 explain that constant voltages rather than a voltage gradient are applied to the electrodes during a period of time, and IF the surface is touched current will flow, meaning that no current will flow if the device is not touched.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Wolfe in the apparatus of Abileah in order to provide for a lower power consuming resistive touch screen to be made.

7. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abileah (US 2003/0222857) in view of Wolfe ("A Case Study in Low-Power System-Level Design", October 2, 1995. Computer Design: VLSI in computers and processors 1995. ICCD 95. Proceedings, 1995 IEEE International Conference on Austin, TX, USA, XP010197333`1, pg. 332-338.) and further in view of Colgan et al. (US 6,483,498).

Regarding claim 15, Abileah and Wolfe disclose the method of operating a resistive touch sensitive screen as recited in claim 14.

Wolfe also discloses a method of operating a resistive touch sensitive screen further including the steps of touching the resistive touch sensitive screen such that the first conductive layer couples to the second conductive layer (Figure 1 and page 333, column 1, lines 6-7 explain that finger pressure causes the first and second conductive layers to contact each other.); and

Abileah and Wolfe fail to teach of determining a location where the resistive touch sensitive screen is touched using currents from the first and second electrodes of the first conductive layer and currents from the first and second electrodes of the second conductive layer.

Colgan et al. disclose of determining a location where the resistive touch sensitive screen is touched using currents from the first and second electrodes of the first conductive layer and currents from the first and second electrodes of the second conductive layer (Fig. 7, see col. 7, lines 51-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Colgan et al. with the apparatus of Abileah and Wolfe in order to allow for a simplistic resistive touch screen where currents can be measured with constant voltage and no voltage switching will be required.

Regarding claim 16, Abileah, Wolfe and Colgan et al. disclose the method of operating a resistive touch sensitive screen as recited in claim 15.

Colgan et al. also disclose a method of operating a resistive touch sensitive screen further including a step of determining a pressure applied to the resistive touch sensitive screen using currents from the first and second electrodes of the first conductive layer and currents from the first and second electrodes of the second conductive layer (Fig. 7, see col. 7, lines 51-65, where calculating a "contact" based on the currents as shown in the formulas is the same as calculating a "pressure").

4. Claims 7 - 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abileah (US 2003/0222857) in view of Chang et al. (US 6,975,307) and further in view of Petty (US 5,859,392).

Regarding claim 7, Abileah and Chang et al. disclose the apparatus as recited in claim 1.

Abileah and Chang et al. fail to teach a detection circuit that comprises: a first current to voltage converter having a first terminal coupled to the first electrode of the first conductive layer and a second terminal; a second current to voltage converter having a first terminal coupled to the second electrode of the first conductive layer and a second terminal; a third current to voltage converter having a first terminal coupled to the first electrode of the second conductive layer and a second terminal; and a fourth current to voltage converter having a first terminal coupled to the first electrode of the second conductive layer and a second terminal.

Petty discloses a current detecting touch panel (see col. 4, lines 12-15) comprising a detection circuit (Fig. 1, controller 16) comprising:

a first current to voltage converter (Fig. 3, 34A) having a first terminal coupled to the first electrode of the first conductive layer and a second terminal (Fig. 3 and Fig. 4, where 34D is representative for all the I/V converters in Fig. 3, and where 20A, which is shown as 20D in Fig. 4, is a first terminal coupled to the corner wire as shown in Fig. 2, where a corner wire connection constitutes an electrode as described on col. 4, lines 12-15; and where the output of amplifier 52 is a second terminal);

a second current to voltage converter having a first terminal coupled to the second electrode of the first conductive layer and a second terminal; a third current to voltage converter having a first terminal coupled to the first electrode of the second conductive layer and a second terminal; and a fourth current to voltage converter having

a first terminal coupled to the first electrode of the second conductive layer and a second terminal (Fig. 3 and Fig. 4, where the description of the first current to voltage converter above is analogous to the second, third, and fourth current to voltage converters 34B-34D on Fig. 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the controller of Petty in the panel of Abileah and Chang et al. in order to be able to convert and measure current produced in the resistive touch screen into voltage values.

Regarding claim 8, Abileah, Chang et al. and Petty disclose the apparatus as recited in claim 7.

Petty further teaches an analog to digital converter responsive to said second terminals of said first, second, third, and fourth current to voltage converters (Fig. 3, converter set 38A – 38D, see col. 5 lines 65-67).

Regarding claim 9, Abileah, Chang et al. and Petty disclose the apparatus as recited in claim 8.

Petty further teaches an apparatus wherein said detection circuit further including a microcontroller responsive to said analog to digital converter (Fig. 3, coordinate calculator 48 constitutes a microcontroller and it receives the signals from the A/D converters 38A – 38D).

Regarding claim 10, Abileah, Chang et al. and Petty disclose the apparatus as recited in claim 9.

Petty further teaches an apparatus wherein said first current to voltage converter comprises: an amplifier (Fig. 4, 52) having a positive input coupled to a first reference voltage (see col. 6, lines 35-37), a negative input coupled to said first terminal of said first current to voltage converter (Fig. 4, where the input line 20D is connected to the first terminal as described above in regards to claim 7), and an output coupled to said second terminal of said first current to voltage converter (Fig. 4, where the output of the amp 52 was the second terminal as described above in regards to claim 7); and a resistor having a first terminal coupled to said output of said amplifier and a second terminal coupled to said first terminal of said first current to voltage converter (Fig. 4 shows such a resistor below amp 52 connected between the first and second terminal).

Regarding claims 11-13, please refer to the rejection of claim 10 in which the description in regards to the first current to voltage converter is analogous to the descriptions of the second, third, and fourth current to voltage converters respectively, where each is show in Petty, Fig. 3.

5. Claims 18 - 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colgan et al. (US 6,483,498) in view of Chang et al. (US 6,975,307) and further in view of Petty (US 5,859,392).

Regarding claim 18, Colgan et al. disclose an apparatus comprising:

a resistive touch screen (see col. 1, lines 40-42);

a substrate (see col. 2 lines 65 – col. 3, line 1).

Colgan et al. fail to explicitly teach wherein a voltage on electrode corners of the substrate remain substantially constant during operation of said resistive touch screen.

Chang et al. disclose wherein a voltage of each of said plurality of wires remains substantially constant during operation of said resistive touch screen (Figure 4 and column 3, lines 10-15 explain that the external powers V_{cx} and V_{cy} supply constant voltages to the x and y plates.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Chang et al. with the resistive touch screen taught by Abileah in order to provide for improved touch detection of touches that are applied to the touch panel too lightly.

Colgan et al. and Chang et al. fail teach a plurality of current to voltage converters on said substrate responsive to said resistive touch screen; and a plurality of wires coupling said resistive touch screen to said plurality of current to voltage converters.

Petty discloses a touch panel comprising a plurality of current to voltage converters on said substrate responsive to said resistive touch screen (Fig. 3, converters 34A – 34D); and a plurality of wires coupling said resistive touch screen to said plurality of current to voltage converters (Fig. 3, see col. 4, lines 12-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the controller of Petty in the panel of Colgan et al. and Chang et al. in order to be able to convert and measure the current that Colgan is detecting.

Regarding claim 19, Colgan et al., Chang et al. and Petty disclose the apparatus of claim 18.

Petty further teaches an A/D converter on said substrate responsive to said plurality of current to voltage converters (Fig. 3, converter set 38A – 38D, see col. 5 lines 65-67); and a microcontroller on said substrate responsive to said A/D converter (Fig. 3, coordinate calculator 48 constitutes a microcontroller and it receives the signals from the A/D converters 38A – 38D).

Regarding claim 20, Colgan et al., Chang et al. and Petty disclose the apparatus of claim 18.

Colgan further teaches an apparatus wherein said plurality of wires conduct substantially zero current under quiescent conditions (Fig. 7, see col. 7, lines 51-65, where contact between the layers causes a current flow to the electrodes, which means there was no current flowing prior to contact).

Regarding claim 21, Colgan et al., Chang et al. and Petty disclose the apparatus of claim 18.

Colgan further teaches an apparatus wherein said plurality of wires conduct a current when said resistive touch screen is touched (Fig. 7, col. 7, lines 51-65).

Regarding claim 22, Colgan et al., Chang et al. and Petty disclose the apparatus of claim 19.

Colgan further teaches an apparatus wherein a pressure applied to said resistive touch screen is calculated from said currents conducted by said plurality of wires when said resistive touch screen is touched (Fig. 7, see col. 7, lines 51-65, where calculating a "contact" based on the currents as shown in the formulas is the same as calculating a "pressure").

Allowable Subject Matter

8. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

Relative to dependent claim 17, the prior art of record (Abileah, Colgan, Petty) does not teach sending an alert signal when the currents from the first and second

electrodes of the first and second conductive layers added together do not equal approximately zero.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Dotson (US 6,980,201) discloses a resistive touch panel (Figure 1B) in which reference voltages are applied to each of the electrodes of the touch panel.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen G. Sherman whose telephone number is (571) 272-2941. The examiner can normally be reached on M-F, 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SS

1 December 2006

AMR A. AWAD
SUPERVISORY PATENT EXAMINER